

WHAT IS CLAIMED IS:

1. A defect management apparatus for performing a defect management for a rewritable recording medium having a data area and a spare area in its recording surface, the defect management apparatus comprising:
 - a defect information generating device for generating defect information which indicates at least a position of a defect existing on or in the recording surface of the rewritable recording medium, when data recorded in the recording surface of the rewritable recording medium is read;
 - 10 a recording position determining device for determining, on the basis of the defect information, whether or not the data is recorded at the position of the defect, when the data is recorded into the rewritable recording medium;
 - 15 an alternative recording device for executing an alternative recording for recording data including the same contents as those of the data recorded at the position of the defect into the spare area of the rewritable recording medium, if the recording position determining device determines that the data is recorded at the position of the defect; and
 - 20 a time controlling device for controlling a time point to execute the alternative recording by the alternative recording device such that the alternative recording is executed within a time period that continuation of a state that recording the data into the rewritable recording medium is not performed is predicted.
2. The defect management apparatus according to claim 1, wherein the alternative recording device comprises:

a recognizing device for recognizing the position of the defect on the basis of the defect information;

a reading device for reading the data recorded at the position of the defect recognized by the recognizing device; and

5 a recording device for recording the data read by the reading device into the spare area of the rewritable recording medium.

3. The defect management apparatus according to claim 1, wherein the alternative recording device comprises:

10 a recognizing device for recognizing the position of the defect on the basis of the defect information;

an alternative-recording determining device for determining whether or not the data recorded at the position of the defect is data that requires the alternative recording;

15 a reading device for reading the data recorded at the position of the defect recognized by the recognizing device, if the alternative-recording determining device determines that the data recorded at the position of the defect is the data that requires the alternative recording; and

20 a recording device for recording the data read by the reading device into the spare area of the rewritable recording medium.

4. The defect management apparatus according to claim 3, wherein the alternative-recording determining device determines that the data recorded at the position of the defect is the data that requires the alternative recording, if 25 the data recorded at the position of the defect is control data or management data.

5. The defect management apparatus according to claim 1, wherein the time controlling device allows the alternative recording device to execute the alternative recording at a time point that an instruction to stop or suspend the
5 data recording is inputted.

6. The defect management apparatus according to claim 1, wherein the time controlling device allows the alternative recording device to execute the alternative recording at a time point that the recording of video or audio data
10 to be recorded continuously is complete.

7. A data recording apparatus for recording data into a rewritable recording medium having a data area and a spare area in its recording surface while performing a data communication with a recording control apparatus,
15 the data recording apparatus comprising:

a defect information generating device for generating defect information which indicates at least a position of a defect existing on or in the recording surface of the rewritable recording medium, when the data recorded in the recording surface of the rewritable recording medium is read;

20 a recording position determining device for determining, on the basis of the defect information, whether or not the data is recorded at the position of the defect, when the data is recorded into the rewritable recording medium;

25 a sending device for sending notice that the data is recorded at the position of the defect to the recording control apparatus, if the recording position determining device determines that the data is recorded at the position of the defect; and

an alternative recording device for executing an alternative recording for recording data including the same contents as those of the data recorded at the position of the defect into the spare area of the rewritable recording medium, if an instruction to execute the alternative recording is received from
5 the recording control apparatus.

8. The data recording apparatus according to claim 7, wherein the alternative recording device comprises:

10 a reading device for reading the data recorded at the position of the defect from the rewritable recording medium; and

a recording device for recording the data read by the reading device into the spare area of the rewritable recording medium.

9. A recording control apparatus for controlling a data recording apparatus
15 for recording data into a rewritable recording medium having a data area and a spare area in its recording surface, while performing a data communication with the data recording apparatus, the recording control apparatus comprising:

20 a recognizing device for recognizing that the data recording apparatus records the data at a position of a defect existing on or in a recording surface of the rewritable recording medium;

25 an instructing device for sending, to the data recording apparatus, an instruction to execute an alternative recording for recording data including the same contents as those of the data recorded at the position of the defect into the spare area of the rewritable recording medium, if the recognizing device

recognizes that the data recording apparatus records the data at the position of the defect; and

a time controlling device for controlling a time point to send the instruction to execute the alternative recording via the instructing device such that the instruction is sent within a time period that continuation of a state that recording the data into the rewritable recording medium is not performed is predicted.

10. The recording control apparatus according to claim 9, wherein the instructing device comprises an alternative-recording determining device for determining whether or not the data recorded at the position of the defect by the data recording apparatus is data that requires the alternative recording.

11. The recording control apparatus according to claim 10, wherein the alternative-recording determining device determines that the data recorded at the position of the defect is the data that requires the alternative recording, if the data recorded at the position of the defect is control data or management data.

20 12. The recording control apparatus according to claim 9, wherein the time controlling device allows the instructing device to send the instruction to execute the alternative recording at a time point that an instruction to stop or suspend the data recording is inputted.

25 13. The recording control apparatus according to claim 9, wherein the time controlling device allows the instructing device to send the instruction to

execute the alternative recording at a time point that the recording of video or audio data to be recorded continuously is complete.

14. A defect management apparatus for performing a defect management
5 for a rewritable recording medium, the defect management apparatus
comprising:

a defect information generating device for generating defect information
which indicates at least a position of a defect existing on or in a recording
surface of the rewritable recording medium, when data recorded in the
10 recording surface of the rewritable recording medium is read;

a recording position determining device for determining, on the basis of
the defect information, a recording position which is located at a position
different from the position of the defect; and

a recording device for recording the data at the recording position
15 determined by the recording position determining device.

15. The defect management apparatus according to claim 14, wherein the
recording position determining device determines the recording position
different from the position of the defect, if the data to be recorded is control
20 data or management data.

16. A computer program product in a computer-readable medium for
tangibly embodying a program of instructions executable by a computer to
make the computer function as a defect management apparatus for performing
25 a defect management for a rewritable recording medium having a data area

and a spare area in its recording surface, the defect management apparatus comprising:

5 a defect information generating device for generating defect information which indicates at least a position of a defect existing on or in the recording surface of the rewritable recording medium, when data recorded in the recording surface of the rewritable recording medium is read;

10 a recording position determining device for determining, on the basis of the defect information, whether or not the data is recorded at the position of the defect, when the data is recorded into the rewritable recording medium;

15 an alternative recording device for executing an alternative recording for recording data including the same contents as those of the data recorded at the position of the defect into the spare area of the rewritable recording medium, if the recording position determining device determines that the data is recorded at the position of the defect; and

20 a time controlling device for controlling a time point to execute the alternative recording by the alternative recording device such that the alternative recording is executed within a time period that continuation of a state that recording the data into the rewritable recording medium is not performed is predicted.

25 17. A computer program product in a computer-readable medium for tangibly embodying a program of instructions executable by a computer to make the computer function as a data recording apparatus for recording data into a rewritable recording medium having a data area and a spare area in its recording surface while performing a data communication with a recording control apparatus, the data recording apparatus comprising:

a defect information generating device for generating defect information which indicates at least a position of a defect existing on or in the recording surface of the rewritable recording medium, when the data recorded in the recording surface of the rewritable recording medium is read;

5 a recording position determining device for determining, on the basis of the defect information, whether or not the data is recorded at the position of the defect, when the data is recorded into the rewritable recording medium;

10 a sending device for sending notice that the data is recorded at the position of the defect to the recording control apparatus, if the recording position determining device determines that the data is recorded at the position of the defect; and

15 an alternative recording device for executing an alternative recording for recording data including the same contents as those of the data recorded at the position of the defect into the spare area of the rewritable recording medium, if an instruction to execute the alternative recording is received from the recording control apparatus.

18. A computer program product in a computer-readable medium for tangibly embodying a program of instructions executable by a computer to make the computer function as a recording control apparatus for controlling a data recording apparatus for recording data into a rewritable recording medium having a data area and a spare area in its recording surface, while performing a data communication with the data recording apparatus, the recording control apparatus comprising:

a recognizing device for recognizing that the data recording apparatus records the data at a position of a defect existing on or in a recording surface of the rewritable recording medium;

5 an instructing device for sending, to the data recording apparatus, an instruction to execute an alternative recording for recording data including the same contents as those of the data recorded at the position of the defect into the spare area of the rewritable recording medium, if the recognizing device recognizes that the data recording apparatus records the data at the position of the defect; and

10 a time controlling device for controlling a time point to send the instruction to execute the alternative recording via the instructing device such that the instruction is sent within a time period that continuation of a state that recording the data into the rewritable recording medium is not performed is predicted.

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19. A computer program product in a computer-readable medium for tangibly embodying a program of instructions executable by a computer to make the computer function as a defect management apparatus for performing a defect management for a rewritable recording medium, the defect 20 management apparatus comprising:

a defect information generating device for generating defect information which indicates at least a position of a defect existing on or in a recording surface of the rewritable recording medium, when data recorded in the recording surface of the rewritable recording medium is read;

a recording position determining device for determining, on the basis of the defect information, a recording position which is located at a position different from the position of the defect; and

- a recording device for recording the data at the recording position
- 5 determined by the recording position determining device.